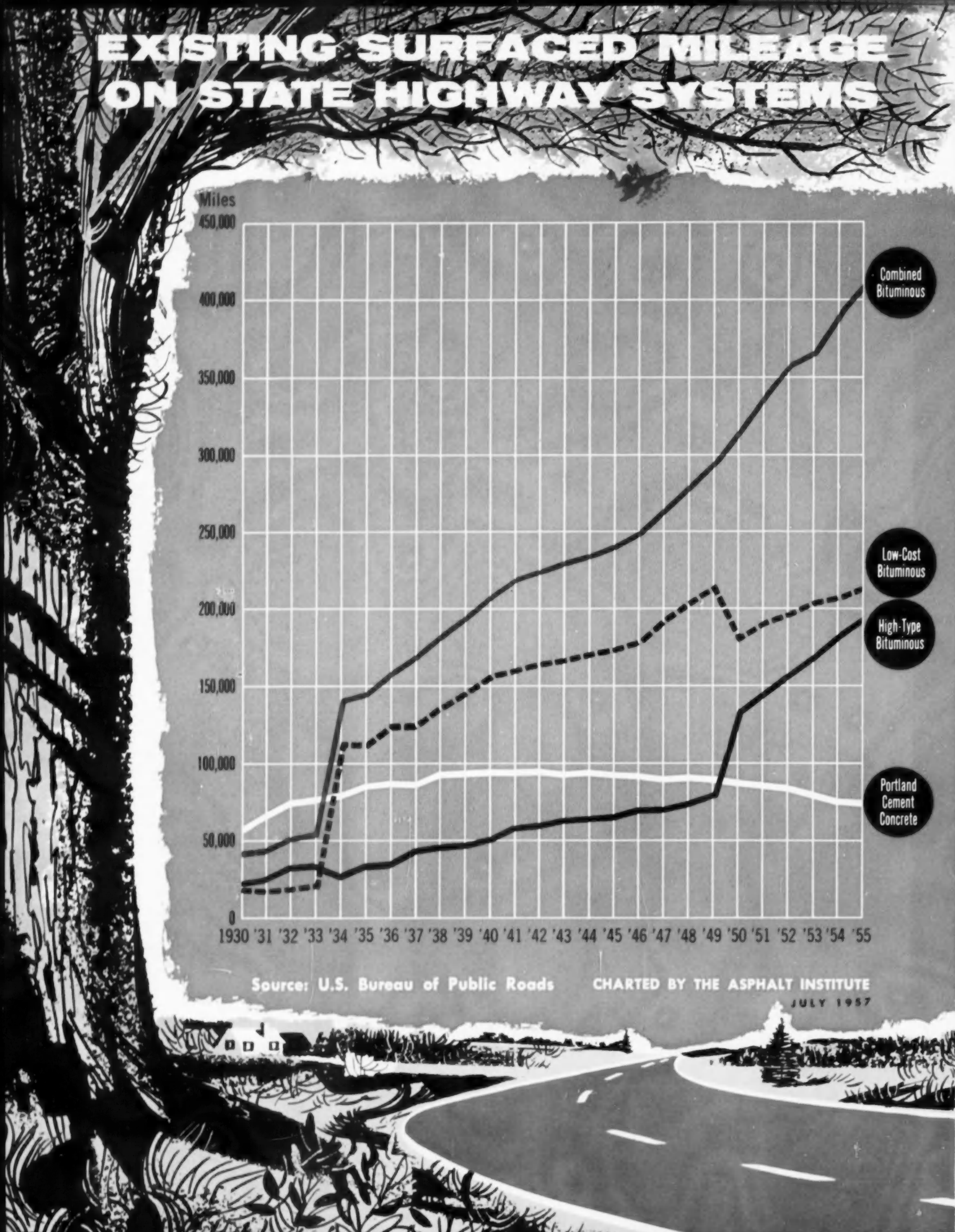
Asphalt Institute Quarterly

JULY, 1957

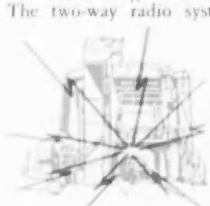

EXISTING SURFACED MILEAGE ON STATE HIGHWAY SYSTEMS
Miles
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
1930 '31 '32 '33 '34 '35 '36 '37 '38 '39 '40 '41 '42 '43 '44 '45 '46 '47 '48 '49 '50 '51 '52 '53 '54 '55
Combined Bituminous
Low-Cost Bituminous
High-Type Bituminous
Portland Cement Concrete
Source: U.S. Bureau of Public Roads
CHARTED BY THE ASPHALT INSTITUTE
JULY 1957

ASPHALTOPICS

"If you hear it, you're near it." That's what they're saying in Cook County (Ill.), where tests using a specially treated pavement surface on approaches to stop sign intersections have proved highly successful (see "Asphaltopics," AIQ, October 1955). The first experimental "rumbling" surfaces placed on asphalt pavements two years ago received such favorable reaction that the Cook County Highway Department has laid them at 62 additional intersections in the county. The built-in alarm clock consists of a 300-foot lane primed with liquid asphalt and overlaid with sufficient particles of screened slag to cause an audible rumble when a car rolls over it. The unexpected noise alerts the driver, adding a positive safety factor at intersections where roadside conditions may distract him.

Probably the one feature of modern asphalt pavement the motorist instantly recognizes is its smoother riding quality. This outstanding advantage was further demonstrated in recent tests conducted by the North Carolina State Highway Division. Using a Bureau of Public Roads "Road Roughness Indicator," North Carolina measured 26 asphaltic concrete and sand-asphalt pavements built in 1946 and five projects of slab pavement five to seven years old. The "roughometer" calibrates in inches per mile; i.e., it counts the number of inches the wheel of the instrument travels vertically with reference to the frame of the machine as it moves at 20 mph over one mile of pavement. The results? Even the roughest bituminous surface, which measured 80.7 inches per mile, was smoother than the smoothest slab pavement. In further comparison, the smoothest asphalt pavement measured only 48.4 inches per mile.

Radio-dispatched asphalt is a new service technique introduced by Industrial Asphalt, a Southern California firm rated as one of the world's largest commercial producers of asphalt paving mixtures. The two-way radio system has been in operation only two years but has significantly increased the efficiency of the multiple and widespread operations of the 17-plant firm. The system consists of 22 mobile units, 10 base stations, and 3 repeater transmitter receivers situated in nearby mountains. According to Company officials it provides continual job-to-plant communication and synchronized operation, insuring, among other things, hot delivery to exact specifications, rapid dispatch of extra loads, quick correction of mistakes.



A new self-contained, self-propelled earth tamper has been developed that is particularly useful for working in narrow ditches or trenches. From clay to granular materials and crushed stone as well as hot and cold asphalt mixes—this tamper effectively compacts them all. And it does so without air compressors, air hammers, or lines or hoses. With a compacting capacity of more than twenty-two hundred 1800-pound impacts a minute, the new machine has a working speed of up to 45 feet a minute. The one-man operated tamper combines vibration and impact to properly keyseat all materials. Interchangeable shoes are available to fit almost any job requirement. To reduce operator fatigue, the machine is equipped with rubber mountings, shock absorber, and sponge handle grips that minimize vibration.

Remember—the known economy and rugged durability of modern, heavy-duty asphalt paving were never more important than they are right now to America's Grand Plan for highway modernization and construction.

ASPHALT PAVES OUR FINEST HIGHWAYS

ASPHALT INSTITUTE *Quarterly*

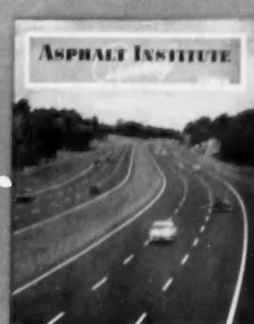
Vol. 9, No. 3, July, 1957

EDITOR
Richard C. Dresser

Contents

Cover

Old New England boasts the Nation's newest toll superhighway, the 123-mile Massachusetts Turnpike. This is a view of the six-lane section between Weston—the eastern terminus near Boston—and Framingham. The smooth, asphalt-paved Turnpike, officially opened to traffic this Spring, constitutes another link in the nation's growing network of safe, high-speed superhighways.



The Asphalt Institute Quarterly is published by The Asphalt Institute, an international, nonprofit association sponsored by members of the asphalt industry to serve both users and producers of asphaltic materials through programs of engineering, research and education.

The Member Companies of the Institute, who have made possible the publication of this magazine, are listed on page 15.

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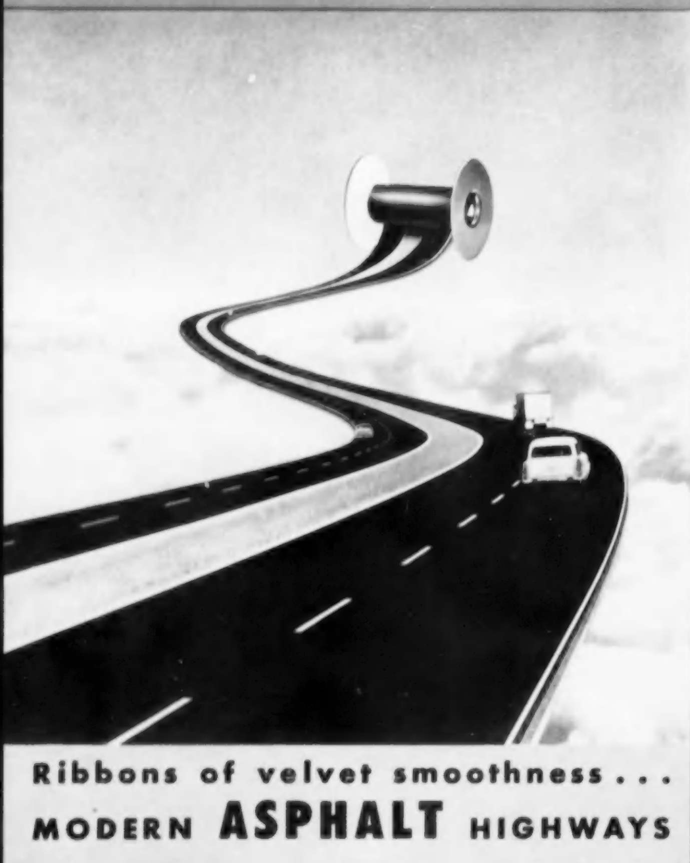
INSTITUTE AD PROGRAM KEEPS ON ROLLING



The Asphalt Institute's 1957 advertising campaign symbol.

In the July 1956 issue, the *Quarterly* reported on a new national advertising campaign for The Asphalt Institute. The first ad, a two-page spread featuring the campaign's symbol, appeared in LIFE magazine on May 28, 1956. Once a month thereafter through 1956 LIFE carried to its 25 million readers the story of modern asphalt pavement superiority for heavy-duty highway construction. CBS network radio beamed it to motorists nationwide on the Institute-sponsored summer week end program "Weather Along the Highways." The nation's business and thought leaders read it in the U.S. NEWS AND WORLD REPORT and THE WALL STREET JOURNAL. Ads with an engineering flavor were placed in influential engineering trade magazines reaching highway and municipal road-builders. The pages of THE OIL DAILY stressed in a series of insertions the increasing importance of asphalt paving to the parent petroleum industry. The Institute's message also reached commercial highway users, engineering students, and state legislators through special ads in TRANSPORT TOPICS, student publications and state capital newspapers.

This major advertising effort, with some media changes and additions, is continuing this year. The prime purpose of the 1956 program was to promote a greater knowledge of asphalt as a paving material among the various "publics" to which advertising was directed. The goal of the 1957 campaign during this period of unprecedented road construction and rising construction costs is to register even more forcefully on the American motorist and highway builder the economy, durability and smoother-riding qualities of modern heavy-duty asphalt highways.

On the recommendation of The Asphalt Institute's ad agency, Marschalk and Pratt Division of McCann-Erickson, Inc., the Institute's Publicity Committee approved a program designed for maximum impact. To the media schedule has been added the SATURDAY EVENING POST, supplementing LIFE in the consumer area and replacing radio. The FARM JOURNAL, with its broad rural coverage, EDITOR AND PUBLISHER and TRANSPORT TOPICS are bringing informative Institute ad messages to the farmer, the editor and the commercial highway user. Eight well known engineering trade magazines, including the newly-added BETTER ROADS and CONSULTING ENGINEER, are on the schedule. The 1956 campaign to furnish information on asphaltic materials to the engineering student through ads in 77 college engineering magazines continues during 1957. THE OIL DAILY and U.S. NEWS AND WORLD REPORT also remain on the 1957 media list. A series of ads has appeared in state capital or leading newspapers in all 48 states.

A new campaign symbol, actually a modification and simplification of the one that appeared in most Institute ads in 1956, has been adopted for the 1957 program and will likewise identify most of this year's ads. The new art treatment, as recommended by the ad agency, conveys even more quickly the "image" of the durability and velvet smoothness of modern asphalt highways.

The Institute's national advertising program is being supplemented through ads placed in regional and state "grassroot" publications by each of the Institute's five geographical divisions.

MODERN ROAD BUILDING NEEDS ECONOMY OF ASPHALT CONSTRUCTION

The opening of the Massachusetts Turnpike to traffic on May 15, 1957, marked another significant milestone in the annals of American road-building. By snipping a pair of shears through a flimsy silk ribbon, the Bay State's Governor Furcolo officially forged another link in the nation's mushrooming system of superhighways. Soon, upon completion of a 20-mile hook-up with the New York Thruway, motorists will be able to make the once tortuous trip between Boston and Buffalo without encountering a single stoplight—500 miles of congestion-free driving.

The Massachusetts Turnpike is paved throughout with modern, smooth-riding, heavy-duty hot-mix asphalt. According to an estimate made by the Clarkeson Engineering Company, a Boston firm of consulting engineers, the Turnpike Authority saved over fifteen million dollars by selecting asphalt instead of rigid slab pavement to surface the big road. That amounts to over $122,000 per mile!

ECONOMY THE GENERAL RULE WITH ASPHALT

In highway construction, economy like this isn't just a one-shot happenstance. With asphalt paving it's the general rule. On eight other asphalt-paved turnpikes where actual bid prices could be compared or where engineering estimates of cost were made, the cost of asphalt paving ranged from $11,768 to over $92,000 per mile *lower* than slab pavement. The first-cost economy of modern asphalt paving is an unchallenged fact, as any experienced highway engineer will confirm.

This tremendous economy advantage—and it is by no means the only advantage—that asphalt construction holds over its principal competition among paving materials could well become one of the most significant factors of modern road-building. The drive to cut spending exists today at practically every level of our economy, and ranking highway officials have very properly cautioned against any temptation to over-build, to provide more costly structures than are required.

One of the most important features of the Federal-Aid Highway Act of 1956 is its authorization to proceed with construction of the 41,000-mile National System of Interstate and Defense Highways. The Act is making available $27 billion to cover the original estimate of cost of this momentous project and requires the states to match the 90 percent Federal-Aid appropriation with a 10 percent contribution of their own. The Federal-Aid money is being raised in large part by increased gasoline taxes and levies on other highway-user items authorized last July. A re-estimate of this cost by the states is presently being compiled by the U.S. Bureau of Public Roads, and results will be reported to Congress in January 1958. Indications are that the new estimate will be considerably higher than the original.

When the Interstate program officially got underway about a year ago, the general feeling seemed to prevail that plenty of money and ample time would be available to build the Interstate System within the specified 13-year period. The Federal Government was picking up 90 percent of the tab; surely the states would have no trouble putting up their 10 percent share. Countless other obstacles existed that would have to be overcome, but the matter of financing the huge project appeared to present a problem of little concern.

SITUATION CHANGED

Events of the past year, however, have altered this picture considerably. Since July 1956, when the Highway Act was signed into law, highway construction costs have risen over 4 percent; they continue to climb, slowly but ominously. A year ago it was assumed the states could rather easily meet their end of the 90 percent-10 percent matching bargain; today many are strapped with a critical shortage of road-building funds. And with the probability that the new cost-estimate of building the Interstate System will overshadow the original by billions of dollars, it is entirely conceivable that the Federal Government will be required to raise additional Federal-Aid road-building funds. (The Senate Public Roads Subcommittee, in fact, recently voted to add 7,000 miles to the 41,000-mile Interstate System, boost the estimated construction cost from $27 billion to $44 billion and extend the construction period from 13 to 20 years.)

In the light of past experience most of the money to cover these shortages and increased costs will come from added highway-user taxes. Some states have already raised gasoline and other taxes to obtain their road funds; others will undoubtedly

follow suit. Should the Federal Government be required to get additional money, tax hikes on highway-user items would probably be inevitable.

The 90 percent Federal-Aid appropriation provides a definite temptation to the states to neglect economy, a fact that many prominent highway authorities have recognized. But present financial circumstances dictate that economy cannot be disregarded. Strict adherence to sound, economical practices in the task of implementing America's Grand Plan for highway construction must be observed all along the line. To do otherwise would seriously jeopardize not only the highway program itself but also the safety and welfare of the nation, the economy and defense of which depend so vitally upon a system of adequate roads.

ASPHALT'S CONTRIBUTION

In what elements, then, of this entire business of putting a permanent multi-thousand-mile highway system on the map can real economy be achieved? There are many, of course. Highway paving is one of the most important, and here is where modern asphalt pavement can make its vital and significant contribution.

The asphalt savings effected on the Massachusetts Turnpike and eight other of the nation's finest toll roads have already been mentioned. This is by no means the whole story. With heavy-duty asphalt construction, first-cost savings ranging up to 20 percent and sometimes as much as 50 percent have been posted in virtually *every instance* where competitive bid prices have been compared or cost figures for two pavements designed and built to serve identical traffic in the same locality have been examined. By applying these savings to the construction of a nation-wide system of superhighways, the low-cost advantages of asphalt paving become self-evident. One highway expert figured a *saving of more than $3 billion* by paving the 41,000-mile Interstate System entirely with asphalt.

MAINTENANCE COSTS NO MORE

The first-cost savings are not the only cost advantages of asphalt construction. What about maintenance?

The subject of the cost of maintaining modern asphalt pavements versus concrete pavements has long been spiked with controversy. But the mass of accumulating evidence shows that modern heavy-duty asphalt pavement costs no more to maintain than its rigid slab counterpart. In fact many maintenance records indicate that asphalt costs less. But the salient point is that *the savings resulting from asphalt's first-cost economy will pay for that maintenance, when it becomes necessary, for years to come, thus conserving the taxpayer's original investment in the road in question.* And any maintenance of an asphalt surface, whether it be minor patching or restoration of the surface by refinishing, not only improves the road but extends its service life indefinitely into the future. When the ultimate fate of a deteriorating concrete pavement is, in nearly all cases, resurfacing with asphalt, this pertinent question naturally suggests itself: why not build a road with money-saving asphalt construction in the first place?

There is no room for extravagance in the present road-building program. Selection of modern asphalt pavement, rugged and smooth-riding, far less costly to build and costing no more than any other pavement to maintain, can help lighten substantially the inflationary burden under which America's Grand Plan is now laboring.

Left to right: Ex-Gov. Paul A. Dever, Gov. Foster Furcolo, Mass. Turnpike Chairman William F. Callahan, John R. Kewer and B. H. Grout cutting the ribbon at Turnpike opening on May 15.

Spreading and rolling 1½-inch hot-mix asphalt surface. It took only two years and four months to complete the 123-mile toll road, from initial earthwork to placement of heavy-duty pavement.

When Governor Furcolo cut the ribbon that opened the Massachusetts Turnpike on May 15, it brought to an end an era of Bay State motoring that few seasoned New Englanders, transplanted down-easterners, traveling businessmen and vacationers are likely to mourn. The twin ribbons of velvet-smooth asphalt that now sweep across the 123 miles from the rim of Boston to the west valley of the Berkshires mark *finis* to a once harrowing but unforgettable trip. Briefly, it used to go something like this:

If you were starting out to drive from Boston on a sojourn to the west, you had to allow at least four hours to get across the state to the New York line. Usually you'd come out of the city on Route 9, the old Worcester Turnpike. Not a bad trip so far. But ten miles outside of Worcester you'd leave the Turnpike and pick up Route 20. That's where the picnic would end. From there on you were in for about a hundred miles of some of the most nerve-racking, teeth-chattering, congested and unsafe driving anyone could cook up. And you couldn't do anything except grin and bear it, unless you called it quits and went back. The trip was enough to discourage anyone, and it often did—especially the parochial Bostonian who secretly but ardently believes nothing can touch Beacon Street or Commonwealth Avenue.

If there is any road in the world, however, that can change his mind about this, the new Massachusetts Turnpike ought to do it. In fact, New Englanders, as of this moment, can claim the world's newest, most modern toll highway, and there won't be a soul who'll contest them.

DRIVING TIME REDUCED

This dream facility cuts the driving time between Weston, the eastern terminus, and West Stockbridge, at the western end, from four to about two hours. The Weston to Springfield stretch, once a horrendous drive of more than two hours, can now be covered in about an hour. Vacationing motorists swarming up the Merritt and Wilbur Cross Parkway through Connecticut, will pick up the Turnpike at Sturbridge, in southern Massachusetts. From there the super-road will swish them in a matter of minutes to Boston's asphalt-paved Circumferential Highway (Route 128) and either north to the broad asphalt turnpikes of New Hampshire and Maine, or east around Boston to Cape Cod.

The predictions of traffic engineers indicate the Massachusetts Turnpike will become one of the nation's most heavily traveled toll roads. It is estimated that its dual roadways will carry an average of 25,000 vehicles daily during 1957—45,000 a day during the summer. As summertime New England is one of the country's most popular resort havens, the new road is bound to attract thousands of additional motorists

Pride of the Bay State

AMERICA'S NEWEST ASPHALT TOLL ROAD THE MASSACHUSETTS TURNPIKE

The superhighway boasts 24-feet-wide roadways. Its paved shoulders (10 feet wide outside and 4 feet inside) provide added safety and contribute to strength of the rugged, smooth traffic lanes. Note solid side stripes and excellent delineation of lane markings.

to the famed seashore, mountain and lake spots. The $239 million super-highway is also expected to reopen the lovely uplands of Western Massachusetts, relatively inaccessible to tourists up till now because of the lack of modern roads. Several industries, too, are making plans to develop plant sites near the right of way.

The Turnpike took two years and four months to build, its completion delayed six months by the severe hurricane floods of 1955 which stalled delivery of materials. Barring this misfortune, the job would have been finished in two construction seasons, matching the record accomplished in building the 118-mile asphalt-paved New Jersey Turnpike, the world's most heavily traveled toll facility.

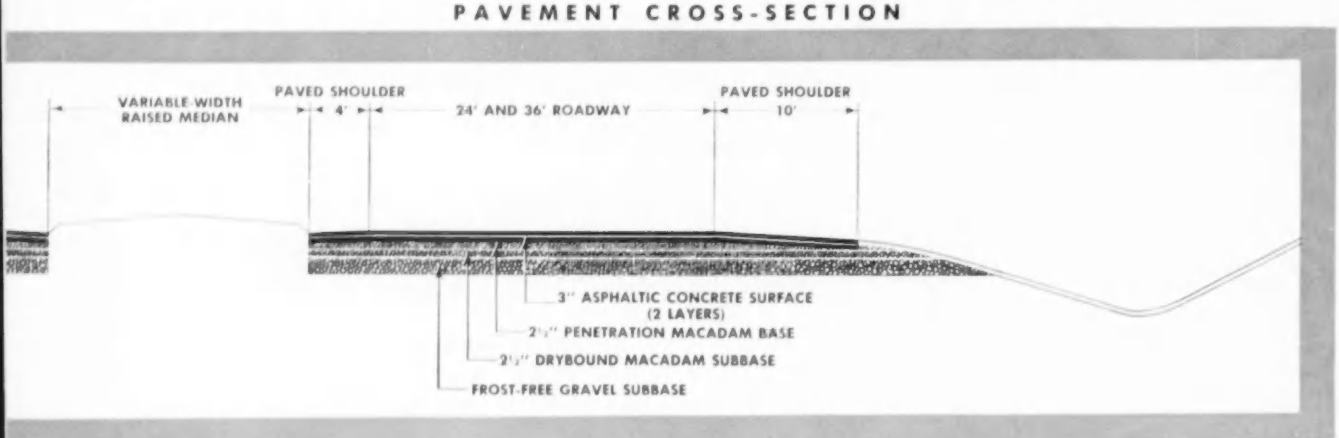
EMPHASIS ON SAFETY

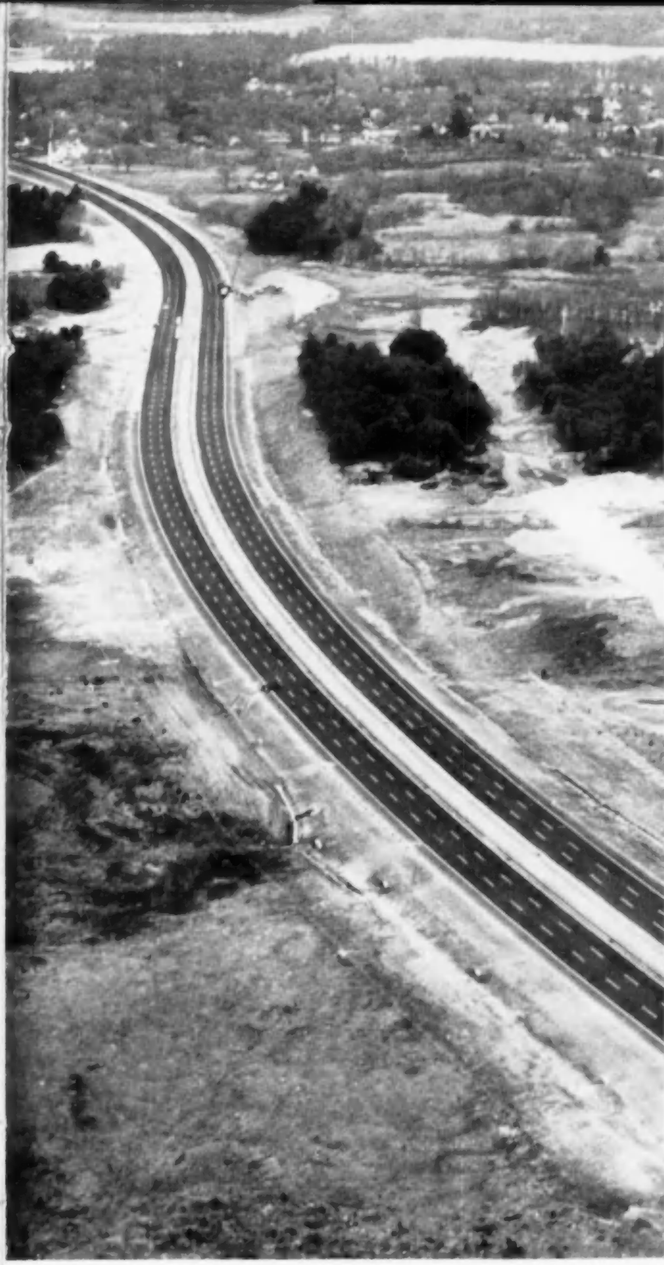
Like its predecessors, the new Turnpike has been designed with principal emphasis upon the safety and comfort of the driver. Because the engineers have quite naturally expected traffic to be heaviest at the highway's eastern end, the roadway, between Weston and Framingham, a distance of 12½ miles, is three 12-foot lanes wide in each direction. Thence it narrows to four lanes for the remaining 111 miles. A raised median strip of varying width separates the two barrels.

A unique feature of the construction, and an outstanding safety advantage, is the provision of paved shoulders the entire length of the Turnpike. These are actually an extension of the heavy-duty asphalt pavement with which the main driving lanes are constructed. The inside shoulders are 4 feet wide; the outside shoulders are 10 feet in width. The latter, separated from the right driving lane by an unbroken white line, not only permit disabled vehicles to park for repairs but also provide extra room and an added measure of safety for vehicles while passing one another. On the 12½-mile six-lane section, the Turnpike Authority has wisely made provision for increasing the driving space to eight lanes to accommodate the heavier traffic of the future. This can be done merely by adding 2 feet of pavement to the existing outside shoulder, a task easily performed with asphalt construction. The present right-of-way is wide enough to permit construction of another 10-foot shoulder if necessary.

Other design features of the Turnpike, such as its controlled access, gentle curves and hills, also make for greater driving safety. The pavement, too, gives motorists added assurance that their trips will be safe and enjoyable. The dark asphalt surface has no expansion joints that so frequently annoy and confuse drivers. It cuts down glare from the sun, a particularly important advantage on a highway running east and west. It provides the needed contrast to indispensable traffic lane markings so often hard to see on light-colored slab pavements. And the textured surface of the heavy-duty asphalt pavement gives better protection against skidding than any other pavement type.

PAVEMENT CROSS-SECTION

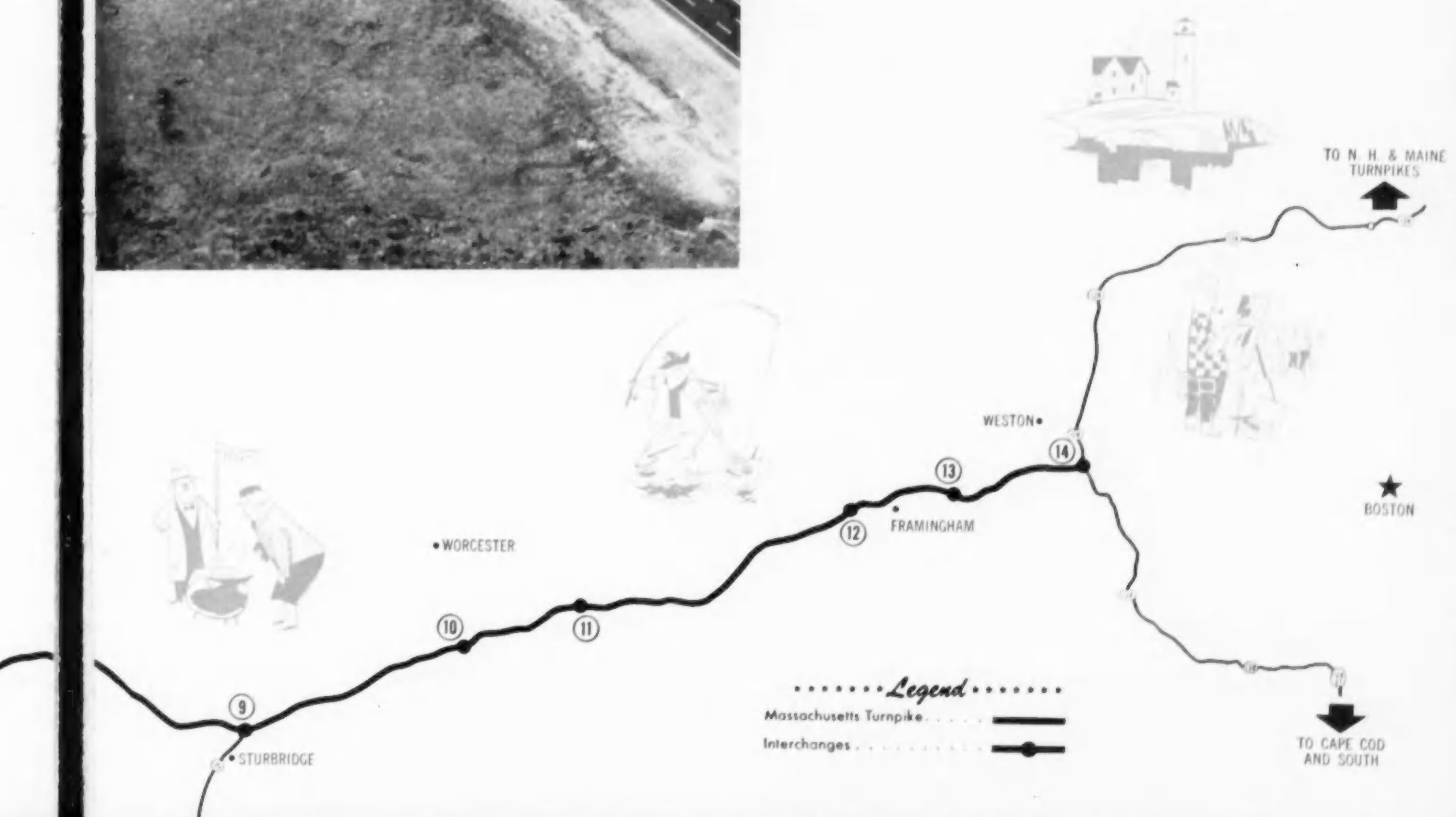




The pavement structure consists of 14 inches of frost-free, free-draining gravel topped by a $2\frac{1}{2}$-inch layer of drybound macadam (a 2-inch stone blend with a 9/16-inch keystone sand for binder) and another $2\frac{1}{2}$-inch penetration macadam course. Two $1\frac{1}{2}$-inch layers of hot-mix asphaltic concrete comprise the heavy-duty pavement surface. The entire structure, built from the ground up under carefully controlled engineering procedures, furnishes a tough, resilient and long-lasting cushion which will withstand the heaviest loads modern traffic can impose. Furthermore, by extending this rugged pavement to include the shoulders, the engineers automatically created an even stronger structure under the driving lanes. As the famed WASHO Road Test demonstrated, asphalt-paved shoulders develop the full inherent strength of the pavement, eliminating the weakening that sometimes occurs at the inside and outside edges.

MAGNIFICENT SHOWPIECE

Bay Staters can now place among their many historic accomplishments one of the truly great marvels of modern engineering. The Massachusetts Turnpike is not only a magnificent showpiece but another fine tribute to the nation's determination to meet the demands of the harassed motorist for modern facilities on which to travel. This great highway offers him driving at its best—speedy, comfortable, safe—and he can depend on its modern asphalt pavement to carry the load as no other pavement will.



THEY'RE OUT TO IMP

One of the serious slab pavement failures on U. S. Route 6 in Iowa. With this type of distress, asphalt resurfacing is the only economical answer.

In widening operation, old shoulders were trenched out to a width of 4' 4" and 12" in depth. Here limestone screenings are being placed. This course was then compacted and primed with cutback asphalt.

Widening machine lays 10" of heavy-duty hot-mix asphalt in 4 lifts. Traffic was maintained at all times during construction.

8-12 ton tandem roller compacts asphalt in widened portion before application of 3" of hot-mix surface to roadway's full width.

IM PROVE IOWA'S HIGHWAYS

A quarter of a century ago, the sun-baked plains of Iowa boasted the tallest corn, the fattest hogs and probably the greatest percentage of paved roads of any state in the Union.

Today, 25 years later, the Iowa corn grows taller than ever and the Iowa hogs bring premium prices at the auction pens. But Iowa's 18-foot-wide highways, designed to accommodate the Essex and Locomobile, are painfully inadequate for modern high-speed traffic. The concrete slabs have cracked and heaved through the years.

Iowa's model highway system of 1932 has become, in 1957, a system which both the Iowa Highway Commission and the state legislature have recognized as badly in need of overhauling.

MODERNIZING CAMPAIGN

To remedy this condition the Commission pledged an all-out drive to modernize the state's antiquated road network. This campaign, launched four years ago, is continuing at an accelerated tempo and, as is usually the case in salvage operations of this kind, modern heavy-duty asphalt pavement is the principal prop for the program.

A typical example of what Iowa is doing to recover lost ground was offered in the first asphalt widening job ever let in this state. This was a 3.3-mile widening and resurfacing project completed during 1956 on U. S. 6—the state's main east-west artery—through the town of Ladora in Iowa County. This is about 10 miles west of Amana, settled 100 years ago by a group of German religionists and today the capital of the home-freezer industry.

By way of preparation for the new construction, 1,520 feet of 3-inch concrete curb was hammered away and cracks in the old slab pavement cleaned and filled. Full depth patching was used to repair the battered, eroded surface.

When the lip curb was demolished, the widened portion was trenched to a depth of 12 inches and a width of 4 feet, 4 inches. After the subgrade was compacted in the trench, 2 inches of limestone screenings were placed for an insulation course, rolled with an 8-12 ton tandem steel roller and primed with rapid curing cutback asphalt. Now the heavy-duty asphalt pavement was placed in 2½-inch lifts to a total thickness of 10 inches, each lift rolled with an 8-12 ton tandem steel roller. The Kaser Construction Company of Des Moines, which had the widening contract, was required to limit its paving operation to the application of two 2½-inch lifts in a single day.

To assure a tight bond, the old slab pavement was tacked with rapid curing cutback asphalt (RC-O). Then two 1½-inch lifts of new asphaltic concrete surface were applied. The resurfacing was experimental in that wire mesh was used.

TRAFFIC MAINTAINED

The widening was performed on each shoulder of the road separately, permitting one-way traffic control throughout the 21-day operation. This included 800 feet of widening through the town of Ladora where the widening started with 3 feet and flared out to a distance of 12 feet on each side of the highway. However, preliminary work performed on curbs, gutters and storm sewers in advance of the widening work is not included in the three-week construction period.

For the 2,500-3,000 vehicles which travel that route daily the miracle of modern asphalt paving has transformed a narrow and dangerous old slab pavement into a smooth, broad highway. And, with the help of versatile asphalt construction, Iowans may one day look out again across their rolling plains tasseled with the tallest corn feeding the fattest hogs alongside the most improved highway system in the United States.

The completed pavement, wider and safer, smoother and stronger. Dark, skid-resistant surface makes white center-line stand out sharply and reduces road glare.

THE BIG TEXAS OVERLAY

Finisher places layer for 7" asphalt hot-mix base course on U. S. Route 69, Jefferson County, Texas. This is the heaviest asphalt overlay of old slab pavement ever constructed in the state. Note that traffic is permitted on base before placement of final surface, a special and unique advantage of asphalt construction.

In the southeast corner of the largest state in the Union, another "first" has been added to Texas' long list of superlatives. Highway Department engineers have recently completed the Lone Star State's heaviest asphalt resurfacing of broken slab pavement. The work took place on a busy 3.7-mile stretch of U. S. Routes 69, 96 and 287, a main north-south artery of the nation's primary highway system.

The Texas Highway Department's program of salvaging and modernizing high-maintenance-cost slab pavement by economical asphalt resurfacing is reflected in the Department's Biennial Reports which show the average annual mileage of each type of pavement on the highway system. These records cover the period 1946 through 1956. They indicate that the mileage of slab pavement reached a peak of 5,431 miles in 1946. Even though over 400 miles of slabs were laid between 1946 and 1956, the total miles of this pavement type had dropped to 3,137 by the end of the 1956 fiscal year. Where did the rigid slab pavement go? During the same period the type of pavement listed "Asphalt on Rigid Base" increased 700%.

CARRIES HEAVY TRAFFIC

U. S. 69-96-287 parallels the navigable Neches River connecting the two bustling cities of Beaumont and Port Arthur. As this section of the state is rich in the production of oil, lumber, rice and other agricultural products, shipments of goods by water and land over the twenty-mile distance between the two ports are heavy. The overland traffic presently averages 8,500 vehicles daily. Huge trailer trucks, their vans laden with produce, constitute a sizeable portion of this.

The section of the road receiving the new overlay extends from farm-to-market road 365 southeast to 39th Street in Port Arthur. Originally surfaced to a width of 20 feet with concrete slabs in 1937, asphalt has miraculously transformed this rough-riding, car-rattling pavement into a modern, four-lane superhighway. Residents of the area confidently expect the new road to last considerably longer than its predecessor, which required major repairs only five years after it was built.

Some of the reasoning behind the selection of asphalt pavement for this important thoroughfare can best be understood by examining the history of the original slab surfacing. Its record vividly illustrates the shortcomings of a pavement type that only asphalt can satisfactorily remedy.

Rehabilitation began in 1942 when several broken slabs were removed on a one-mile section and replaced with new concrete. To fill in depressions in the surface, engineers placed 1,018 tons of cold-mix asphalt. This "leveling-up" process was repeated in 1945 on a 2.7-mile stretch after the worn out slab pavement had been mudjacked. A year later the entire length of concrete pavement was undersealed with asphalt cement (25-35 penetration), an operation that involved drilling 2,500 holes and pumping about 25,000 gallons of asphalt per mile under the slabs. Further improvements took place in 1947, 1953 and 1955, including some widening and asphalt resurfacing.

COMPLETE MODERNIZATION

The present improvement has provided motorists with a modern highway in every sense of the word. The dual-type roadways, 24 feet wide in each direction, are separated by a median strip varying in width from 4 to 6 feet. The 1⅛-inch heavy-duty hot-mix asphalt surface, smooth and rugged, is supported by 7 inches of hot-mix shell-aggregate base. The 10-foot-wide shoulders consist of 12 inches of sand-shell base with asphalt surface treatment.

This Texas project is an excellent example of highway rehabilitation and improvement making full use of values inherent in the existing roadway. The early undersealing of the short-lived slab pavement and subsequent asphaltic patchwork and resurfacing assure a satisfactory foundation for the new 8-inch asphalt base and overlay. The all-asphalt widening, performed easily, quickly and economically, provides a durable pavement structure for the roadway's full width. Pleasure drivers and business travelers alike are now experiencing the exclusive smooth-riding features of a continuous, joint-free length of asphalt pavement and the added safety of a wide, double-barreled superhighway.

UNCORKING A BOTTLENECK IN COLUMBUS

THE tremendous expansion of America's suburbs over the past ten years has created severe traffic problems in virtually every city in the country. No one knows this better than the harried commuter who gets a first hand view of the situation twice a day at least five days a week, year in and year out.

The commuter's the man who took himself and his family out of that noisy fourth floor city apartment and settled down in a neat ranch-type house in a quiet community outside of town. Trouble is, he didn't bundle his job off with him. The result is that each week he loses maybe ten good hours of his valuable time—maybe more—driving to and from his place of business in the city, caught up in a seemingly endless stream of bumper-to-bumper traffic. Such an existence can be ruinous to a man's composure, especially if the roads he travels between city and suburb are the outmoded, stop-and-go type of yesteryear.

CLEARING THE WAY

Most cities, of necessity, are earnestly endeavoring to ease and improve the lot of the commuter by clearing the way for him during rush hours. Some have turned existing two-way streets into one-way thoroughfares during the periods of peak travel in the morning and evening. Some have built controlled-access, elevated superhighways over the heart of the city. Others, where possible, have widened and improved narrow old streets that had outlived their usefulness under this rising tide of commuter traffic.

Lane Avenue, in metropolitan Columbus, Ohio, was such a street not long ago—a winding, twisting road only 20 feet wide imposed with the task of carrying thousands of vehicles daily between Columbus' Olentangy River Road and the residential community of Upper Arlington. It was a bad bottleneck, not only for the commuters who daily wormed their way along the 1½-mile stretch, but also for the heavy Saturday afternoon football traffic in the Fall occasioned by the big games at the Ohio State University stadium located just across the Olentangy River.

In 1955, engineers of the Ohio Department of Highways and Franklin County got together and decided to do something about Lane Avenue. The result of their work is a four-lane, asphalt superhighway that now accommodates over 14,000 vehicles daily without a hint of congestion.

Work on the project began in November 1955. Because of the existing alignment and grade, the engineers decided it would facilitate construction in this case to establish the route on a new location rather than attempt improvement of the old roadway. Extension of a cattle underpass for the Ohio State University Farms and construction of an underpass for the Chesapeake and Ohio Railroad also dictated relocation.

The pavement structure of the new highway consists of a 6-inch crushed aggregate base course (two lifts), a 5-inch waterbound macadam base course, a 3-inch base course of asphaltic concrete and a 3-inch asphaltic concrete surface course placed in two layers.

Both the crushed aggregate and waterbound macadam were placed with a Jersey Spreader Box mounted on a D-6 bulldozer, with water sprayed on the aggregate, along with compaction, to aid in obtaining density. The macadam was rolled with a 10-ton tandem roller and keyed further by a vibrating compactor. Although the vibrator was actually not required, the contractor found that it greatly reduced the subsequent rolling time required for good keying. The vibrator was also very efficient for choking the stone with screenings. The contractor took particular care to avoid over-vibrating. Too much of this type of compaction would have caused bumps and waves to appear in the surface of the macadam.

After waterbinding, which was accomplished by spraying with a pressure distributor and compacting with three-wheel rollers with drag broom attachment, all traffic and equipment were kept off the course until it had dried enough to gain sufficient strength to carry equipment without loosening the top stone. A good smooth base was the result, mainly because the surface tolerances were checked and adjustments made before the top choke was applied.

WIDE AND HANDSOME

Because the width of each roadway of the project is 27½ feet, the finishing machine was extended to 14 feet to enable placement of the heavy-duty asphalt base and surface courses in two passes. This extra width, together with the 16-foot median divider, are excellent safety features that motorists appreciate in modern high-speed thoroughfares.

The new Lane Avenue, a key link between home and business and built with the world's most modern, rugged and economical pavement, is providing Arlington-to-Columbus commuters with quick, smooth and safe driving—a fine tribute to the Ohio highway engineers who conceived and implemented this noteworthy project.

Lane Avenue, Columbus, Ohio, looking toward Olentangy River Road with Ohio State University buildings in background. Construction of the asphalt-paved, high-speed thoroughfare solved an acute congestion problem quickly and at reasonable cost.

THOMAS H. MacDONALD

The Chief

1881-1957

Thomas H. MacDonald—The Chief—is gone. By his death last April 7 the United States lost an engineer of exceptional competence, the highway building profession an outstanding leader. The crusade he headed to construct a vast highway network for America carries on without him; yet his spiritual guidance will be felt as long as roads are built.

Born in Colorado, Tom MacDonald was raised and educated in his adopted state of Iowa. His interest in highway engineering was sparked in undergraduate days at Iowa State College where, for his senior thesis, he wrote a pioneering study on the highway needs of farmers in which he discussed the power required to pull a wagon over different types of road surfaces. In 1904, after receiving his engineering degree, the state legislature ordered a study of the highway situation with a view toward developing methods for future improvement. Iowa State College was given the task and assigned Mr. MacDonald to head the project. The research that went into this undertaking was the beginning of a devotion to highway improvement that was to guide the rest of his life.

When Iowa launched a road improvement program in 1907, Mr. MacDonald accepted the position of state highway engineer. He served in that capacity until 1919 when, his outstanding ability and background having been recognized by officials of the federal government, he was called to Washington to head the newly organized Bureau of Public Roads as the nation's Federal Highway Commissioner. He held this post continuously for 34 years until his retirement, in 1953, at age 72. Not content to stand pat on his long and distinguished career in state and federal service, Mr. MacDonald accepted direction of the highway research center at Texas A & M College. He had made marked progress toward the solution of several current highway problems at the time of his death.

Numerous accomplishments highlighted his fine life in public service, for which he was duly honored. Engineering societies gave him honorary membership; his alma mater conferred upon him its highest graduate degree. He was decorated with the U. S. Medal of Merit and the French Legion of Honor; was invested by the King of Norway as Knight of the First Class of the Order of St. Olav; and was a member of the distinguished Masarykova Akademie of Czechoslovakia. These were appropriate expressions of respect for technical and engineering contributions. More important, however, was the universal esteem in which he was held as a man. He maintained in the highest degree a personal and professional integrity at all times, often under the most trying conditions. He lived simply, on a relatively small salary, yet he administered expenditure of more billions of public funds than any other American in peacetime history, fully supported in his office by seven successive Presidents.

In the opinion of this writer, Tom MacDonald accomplished three things for which he particularly merited the title "The Chief," as he was affectionately and respectfully known.

First, he foresaw with remarkable clarity the potentialities of highway development and made long-range plans to bring them to fruition.

Second, he appreciated fully that these plans could be carried out successfully only through cooperation with the states and in complete recognition of their sovereign rights. Thus he coordinated closely with such organizations as the American Association of State Highway Officials and the Highway Research Board, in whose committees various differences could be adjusted and the next step taken. He recognized, too, the contribution that industry could make and he invited its participation in the standardization and improvement of specifications for materials and equipment.

Third, he was an excellent administrator. Establishing broad, general policies, he delegated authority for local decisions to his field engineers. But even though the responsibility for management of the huge and far-flung operations of present-day Federal-Aid rests heavily on these field men, it is still the states that propose and make plans, and the Federal Government that approves them, in this partnership plan conceived 40 years ago.

One incident may give a glimpse into MacDonald's great foresight. At a Road Show some years ago, long before the Interstate System had been adopted, the Bureau had a model exhibit showing the difference in traffic capacity between a beautiful, controlled-access superhighway and a road cluttered with stop lights and hot dog stands. It was early in the morning when this writer went to view the display. He found Mr. MacDonald alone, watching the smooth operation on the one road and the confusion on the other. "Wouldn't it be wonderful," he mused, nodding toward the superhighway, "if we could have a country-wide system like that, with no cross-traffic. It would soon pay for itself many times over."

And so it will, if we, who carry on, adhere firmly to the sound principles of highway design and operation supported so staunchly by The Chief, Thomas H. MacDonald—Father of the Nation's Highway System.

—Bernard E. Gray

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